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FOREST SERVICE

BRANCH OF RESEARCH

MONTHLY REPORT

OF

FOREST EXPERIMENT STATIONS
FOREST PRODUCTS
FOREST ECONOMICS
RANGE RESEARCH

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BRANCH OF RESEARCH

October, 1932

CONTENTS

	Page
Forest Experiment Stations	
Appalachian	1
California	2
Central States	12
Northeastern	12
Northern Rocky Mountain	14
Pacific Northwest	17
Southern	20
Research Activities, Region 2	22
Manuscripts	25

APPALACHIAN FOREST EXPERIMENT STATION

Forest Management in North Georgia

Four Fp plots, located at the Georgia Mountain Experiment Station, were reexamined. Three of these were planted last November with two year white pine seedlings obtained from Parsons, West Virginia. Two plantings made on old field sites with two different spacings in each plot showed mortalities for the first year ranging from 5.9 per cent to 19 per cent. The third plot, an underplanting, showed a mortality of 40 per cent.

Reproduction on three of the five white pine release plots near Cooper's Creek on the Cherokee National Forest were remeasured. Fifty per cent of the trees forming the overstory on these plots were girdled in the fall of 1931 and fifty per cent were poisoned with sodium arsenite, the poison being applied with a tool devised by MacKinney. Reexamination of these trees and preliminary computations of the data indicate that the poisoning had considerable effect in reducing both sprouting capacity and the maximum height of sprouts.

Preparations were made for the establishment of a series of quadrats to study the germination and survival of poplar as affected by different seed bed conditions. Each of four conditions will be duplicated four times under the Latin square plan.

Forest Management on the Coastal Plain

Following Frothingham's departure for Washington, several recently cutover loblolly pine areas were visited at the request of the Camp Manufacturing Company of Franklin, Virginia. These areas presented excellent examples of the deterioration of over-mature loblolly pine stands. On all areas visited the stands were over 100 years old and were heavily infected with redheart (Trametes pini). One of the areas supporting a stand of pine of 20,000 board feet per acre, gross scale, showed heavy redheart infections in over 30 per cent of the trees. The net yield from this area was approximately 14,000 board feet per acre, indicating a loss of 6,000 board feet per acre due to the infections.

Severe infestations of pine tip moth (Ryacionia frustrana) were noticed in several stands of loblolly pine reproduction in Duplin County, North Carolina, and Isle of Wight and Nansemond Counties, Virginia. In all cases the reproduction examined was from 2 to 12 feet in height. The majority of infested trees appeared to be under 8 feet in height.

Forest Influences

Several heavy rains during the month have allowed opportunity to observe storm flow from the ten runoff plots on the Bent Creek Experimental Forest. These plots represent four distinct vegetation types. Soil moisture determinations are being made on the average of once a week and these will be continued throughout the winter. The 1932 leaf fall during the latter half of the month has apparently introduced a new factor in the rate and

(Over)

amount of storm flow during light rains. The storm flow records for each storm are being plotted for the purpose of studying the differences in run-off under the different vegetation types.

Forest Biology

Burleigh is trapping rodents on the fire plot at Bent Creek to determine definitely, if possible, the actual population per acre. The mice are caught alive, ear-marked, and then liberated to check their movements by retrapping from time to time.

Studies of life histories and distribution of birds and mammals of the Southern Appalachians were continued. This includes the collection of stomachs for future analysis and determination of food habits.

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CALIFORNIA FOREST EXPERIMENT STATION

What with the Copeland Report, and now the revised Public Domain one, and the joys resulting from economy legislation restrictions, not a little scheduled work has had to be laid away in moth balls. One result has been a demonstration of the number of basic things, essential for such far-reaching reports, which we do not know and must perforce make our best estimates for, which at best are of dubious safety. If such reports continue their well started development in annual epidemic character, it will fall for serious consideration whether we must not further encroach upon established projects to get real information upon such of these fundamental matters as do not have to wait upon the long promised Forest Survey forces - lest our pyramided assertions and prophecies accumulate too great weight for their present foundations, and bury us in their own wreck. We suspect that we are not alone in this dilemma.

Forest Management - Pine Region

Seasonal Growth - Weekly measurements of diameter and height growth for the important species were continued from about April 15 to October 15 at Feather River and Stanislaus Branches. On the Stanislaus, stations were located at altitudinal intervals of 1000 feet from the 2000 to the 5000-foot contours. The figures have not been analyzed as yet. It is apparent that height growth this season, with good precipitation, is less than last season with poor precipitation. This conforms to records of other research. The height of one season is determined in the bud of the preceding season. The formation of extra internodes in one season does not seem to be related to summer rains and late warm weather as some believe. No explanation is apparent from weather records. Possibly the roots of certain vigorous trees attain new reservoirs of moisture and good soil after normal seasonal growth is near completion, resulting in renewed height and diameter growth for a brief period. Possibly the tendency to produce extra nodes is inherent in certain species and individuals.

Height growth analyses were made by cutting seedlings in three localities where precipitation records were available for correlation of growth and seasonal precipitation and to provide additional height growth data for seedlings of ponderosa and sugar pines. These cutting analyses emphasize the fact that establishment of seedlings is periodic rather than annual - even with sugar pine. In a given locality practically all the younger seedlings date from a certain favorable year. Several hundred sugar pine seedlings mapped within a radius of 300 feet of a large isolated seed tree were found to be all 29 years old, except one, although the height varied from a few inches to more than 10 feet. These analyses also emphasized the unreliability of ring counts with hand lens or unaided eye to determine dates of establishment, dates of fires, etc. Some weak seedlings do not make discernible rings in some years whereas other vigorous ones make two rings a year repeatedly. Stump counts on cut-over areas may be regarded as worthless for determining dates of establishment with reasonable accuracy.

Site Factors and Reproduction. - Three stations were maintained at the Stanislaus Branch through the growing season - one north-slope timbered, one north-slope clear cut, and one south-slope clear cut. The new Foxboro soil thermographs and maximum-minimum soil thermometers functioned much better than any instruments previously found. Soil temperatures were not so high as last year, though late summer drought was more severe. Seedlings from seed sown at the instrument stations survived even the severest open conditions where spared by rodents. By the end of the growing season sugar pine seedling roots had penetrated to a depth of 26 inches. Soil sampling was considerably extended this season. At the peak of the dry season a large series of samples was taken to check the reliability of current smaller samples.

Natural Reproduction - About 10 per cent of the 2000 permanent milacre quadrats were remapped. These were the quadrats where all vegetation is being charted. In the sugar pine-fir type seedlings were tallied for all quadrats. The expected crop of sugar pine seedlings from the good 1931 seed crop and heavy winter did not materialize. Rodents seem to have mopped up both seed and seedlings.

Methods of Cutting - Subdivision of the 33 large sample plots into smaller plots were closely tied into site index and stocking is being continued. It seems doubtful that this work can be completed before snow closes the roads. One plot in the Lassen was remeasured for the first 5-year period.

About 6 weeks were spent by two crews sampling and examining private cut-over land for the Copeland report. Some of the areas examined in 1921 were revisited. A striking fact is that practically no reproduction has come in since the 1921 examinations. It seems likely that the proportion of deforested land will be greater than was estimated 11 years ago. The chances of restocking decrease as the time after cutting increases because of invasion of brush, further decrease in seed trees and site deterioration.

Forest Management - Redwood Region

During the last five months, June to October inclusive, most of the time of Person, Hallin and Stahelin has been spent on the three projects planned for the redwood region; results of planting, condition of cut-over areas and logging damage from the silvicultural viewpoint.

Field work on the study of results of planting has been completed except for re-examinations of a few plantations with staked trees which will be followed for a number of years. In connection with the sampling of cut-over areas several sample strips were run through planted areas of Dolbeer-Carson, Northern Redwood, Mendocino, and Albion Lumber Companies so that we have now sampled areas planted by each of the ten companies which participated in the project. We also secured additional data on the effect of fires by a study of the survival of planted redwood on the Albion plantations which were burned over in September, 1931. This study, which included the examination of 723 staked trees, supports our previous conclusions that a high per cent of all redwoods planted more than five years will survive a severe fire. It was found that 88 per cent of all fire-injured trees, any remains of which could be found, sprouted after the fire. All of the sprouts were in a healthy condition one year after the fire.

Field work on the cut-over area study was largely completed also. We now have complete data on 15,600 milacre quadrats from the cut-over areas of all of the larger operating companies of Mendocino and Humboldt counties. All of these data were recorded in code and have been transferred to tabulating cards. A preliminary analysis gives interesting results as to stocking. If we assume that 1,000 stocked quadrats per acre constitute 100 per cent stocking we find that stocking from the different tree groups is as follows:

Stocking from -	Amounts to -
Redwood sprouts	7.8 per cent
Redwood seedlings	9.6 " "
Douglas fir seedlings	6.3 " "
Other coniferous "	1.7 " "
Total coniferous stocking	25.4 " "
Total hardwood "	12.0 " "
Total stocking	37.4 " "

This agrees with our results as reported for 1931 in showing a much lower stocking from sprouts than is usually reported and a much better stocking from natural seedlings.

As a part of the general study of cut-over areas a special study was made of the effectiveness of cutting edges and isolated seed trees in increasing stocking. For this purpose strips four chains in width were run out from cutting edges for from five to ten chains. On these strips all seed trees were recorded and reproduction transects were run through the middle of them with groups of four milacre quadrats every half chain. Seventeen of these seed tree strips were run.

A start was made on the study of logging damage to potential "leave" trees. A total of 13 one-half acre plots were laid out on the logging units of Hammond-Little River and the Pacific Lumber Companies. The plan is to determine the amount of injury done to trees which are not utilized, by each step of the logging process - chopping, burning and yarding. Four of the plots will be followed through from before chopping until after yarding is completed, five plots will be followed through burning and yarding only and on four plots only yarding damage will be determined. The different yarding methods studied include the slack-line method, the high lead, and caterpillar yarding. The plots studied this season will be used principally as the basis for outlining a complete logging damage study.

Reforestation and Ecology

Ecology. Much of the early part of the summer was devoted to recharting vegetation on the 36 succession quadrats on the Barranca Burn and on Dr. Lowdermilk's 12 pairs of runoff-and-erosion plots. This was the sixth examination of the Barranca quadrats and the seventh growing season since the burn, but, although the cover has made steady improvement, it still lacks several years of reaching a degree of density and stature approximating that of adjoining unburned areas. In view of the usually rapid recovery of burned chaparral on northerly slopes, this retarded development emphasizes the debilitating effect of site deterioration through fire and erosion on south slope types of southern California.

In the runoff plot examination the need has developed for some means of evaluating the cover and litter conditions by unit areas in terms of its influence on runoff and soil movement. Vast differences exist in each plot within distances of a few feet. Considerably more detail was recorded with regard to surface conditions than heretofore, but the effort to compile and utilize this in analysis leaves the matter still unsatisfactory.

In connection with the Y-canyon study a preliminary test by the potometer method was made of transpiration by white alder (Alnus rhombifolia), by the use of pairs of branches cut from portions of canyon trees in full sun, half-shade and full shade. The results are to be analyzed during the winter.

Forestation. A trip was made by Kraebel through Owens Valley at the request of the Chief Engineer of Los Angeles City Water Department to investigate the plan of extensive tree-planting which has been urged upon the Department by well-meaning citizens for the purpose of "conserving" the city's water supply. We were able to confirm the Department's fears that tree planting in this arid Valley would indeed consume rather than conserve the water whose source is the melting snow of the high Sierra.

Weaver and Ilch have been engaged on examination and summarizing of all planting experiments made to date by the Devil Canyon Branch. Results will be reported from time to time.

In September Kraebel accompanied Woodbury of the Regional Office on an examination of administrative plantations on the Lassen and Modoc Forests. Best results, with success up to 92% were found in a burn planting in the Warner Mountains; poorest in an experimental planting in brushfields in strips cleared by tractor. In the latter case the heavy losses were due to mutilation by rodents not to rigors of site or other plant-reaction causes.

Erosion Control - Highways. Slope-fixation work, under the direction of the Station, was begun during October on the Mill Creek Forest Highway of the San Bernardino Forest. Funds for this purpose have been set up by the Regional Office and the work is being done by a crew of 12 men under the foremanship of Junior Forester Ilch. Various modifications of the contour-wattle method originally used on the Waterman Canyon experiment, and the use of straw-litter in various ways, are being tried in the effort to secure experimental values from this administrative job. On the Santa Barbara Forest, Supervisor Nash-Boulden is also trying out variations of the litter and wattle methods on overcast slopes of the Camino Cielo.

Erosion Control - Burns. In response to requests from communities close to the big "Matilija" fire of September on the Santa Barbara Forest, Director Kotok with Lowdermilk and Kraebel of the Station and Fire Chief Price and Engineer Kramer of the Regional Office, joined local representatives in a series of field examinations and conferences to determine what could be done to minimize the expected damage from flood and erosion during the coming winter. It was a large order, the fire having swept some 219,000 acres of the forest and destroyed the cover on large portions of several important watersheds upon which depend the water supplies of the cities and agricultural communities of Santa Barbara, Montecito, Ventura, Santa Paula and many smaller places. Among the works seriously threatened with damage by silt deposits are the costly Gibraltar and Juncal reservoirs belonging to Santa Barbara and Montecito respectively.

On Monday, October 31st, 18 tons of seed were started in to the Gibraltar and Juncal watersheds to be broadcast by hand on 4,000 acres previously selected, 2,000 acres in each watershed. An additional quantity of 9 tons is stored at the Carpenteria airport to be sown by airplane on 2,000 acres of less accessible terrain, 1,000 acres in each watershed. Sowing by both methods will be at 9 pounds per acre as nearly as this can be done. The seed mixture is as follows:

Trieste mustard (Brassica juncea)	40%
Black mustard (Brassica nigra)	40%
Sour clover (Melilotus indica)	15%
White clover (Melilotus alba)	5%

In addition, experimental plots are being sown with unmixed seed of these and other species, including bur clover, rye, wheat, barley, wild oats and Australian rye grass. Although the cereal grains, especially wheat, have given excellent results in road-slope fixation, they were deemed unsuitable for large-scale seeding because of their excessive bulk and weight and because of the slight chance of their establishment from surface sowing without harrowing or other means of working them into the

soil. The experimental plots are designed to evaluate the various species in terms of both performance and cost per acre treated.

Erosion-Streamflow Investigations

Erosion-Streamflow Experimental Forest

The recent paper by Hoyt and Troxell, which will be reviewed by Lowdermilk, shows at least the need for controlled studies to answer authoritatively the questions which they raise and which are continuously arising in regions of critical water supply or in times of prolonged drought. It was with just such a purpose in view that plans were made to establish a watershed experiment in which all factors should be brought as nearly under control or measurement as was experimentally practicable. Location of suitable watershed areas in southern California has occupied Lowdermilk's time during most of the spring, summer and autumn. The search was pursued into several possible areas, after local Forest officers had been consulted and a close study of airplane views of the mountainous region of Los Angeles County Flood Control District had been made. On our final survey of possibilities we were favored by field conferences with Mr. Munns who knows the Angeles like a favorite book.

The choice finally rested on San Dimas and Big Dalton watersheds on the Angeles National Forest. These two canyons are fitted with flood control dams and are being recommended to be set aside as an experimental forest, where all phases of interrelationships of vegetation and water supply may be worked out on a scientific basis. A preliminary working plan was prepared to form the basis of discussions with consulting engineers and foresters.

Berkeley Installation

Hamilton has put the Berkeley chaparral lysimeters and run-off plots in condition for the coming season. Results of percolation through the soil masses within the 10 compartments will be through a disturbed soil condition. The ratio of such percolation to that through an undisturbed profile could not be known without further instrumentation. It is particularly desired to know when the behavior of water relations within the big lysimeters approximates conditions in undisturbed soil.

For this purpose a soil core cutter instrument and fittings to enclose a core of a natural soil profile was designed last spring. The working out of this instrumentation and its installation may be of some interest to other scientific workers in this field. A memorandum covering details and diagrams is being prepared. It will suffice here to indicate that a core of soil 50 inches deep and 35.7 inches in diameter was cut out by sinking around it a core cutter of galvanized iron. The core cutter was forced into the soil under pressure of a bin of soil mounted on top, through guides, when a furrow about the core cutting edge was kept wet with water to make the soil plastic at the cutting line.

When the core cutter had been sunk to proper depth, a 1/4-inch galvanized iron plate made rigid with angle irons was easily forced under the core cutter into the kerf of a crosscut saw which was used to saw the soil in advance of the plate. This method worked beautifully and may be of interest to others interested in such installations.

The core cutter and bottom plate are to be joined by electrically welding a 1/4 x 3-inch rim to the lower reinforcing band and to the bottom plate. A space 1/4-inch wide below the reinforcing band will permit free movement of water to the outlets after it has come to the edge of core. A thin layer of sand under the outer half of the soil core will drain the soil core to this space. It is not known if this method of sealing bottom plate to lysimeter walls has been employed before. It holds promise of comparatively low costs and effectiveness.

Experimental runs on the Berkeley tanks were made during the summer by Rowe. A series of experiments of applying litter to erosion pavement surfaces was run with results showing that mechanical effect of litter is an important part of its function aside from protecting the soil from a muddy suspension.

North Fork Installations

The North Fork installations were put into condition for the rainy season by Rowe. Of particular interest here is the installation of our improved rain retention pans to determine effectiveness of rain. The new pans were improved on the basis of experience with circular pans. The new retention pans are rectangular 20 - 50 inches and provide for a 20-inch depth of soil on a slope of 27-1/2 per cent. Both surficial run-off and seepage will be measured in cubic inches. A 500-cubic-inch graduate was manufactured for these measurements.

Devil Canyon Installations

Installations at Devil Canyon were put in condition by Sinclair. We have a complete set of stream gagings for our Y-canyon experiment on transpiration losses by riparian vegetation. The Bureau of Agricultural Engineering is cooperating with us in this study. A progress report on the study is planned for the spring.

Matilija Burn and Silting of Reservoirs

A flight was made by Lowdermilk over the 200,000-acre burn, caused by the Matilija fire to consider methods of reducing effects of erosion from the burn. Pictures were taken. The Juncal reservoir in which storage has cost approximately $350 per acre foot, is menaced by heavy silting if heavy rains of high intensity occur during the coming rainy season. The conclusion of consulting engineers on methods of reducing possible silting of the reservoir as well as of protection of spreading works on the Santa Clara River will mark an historic event. The use of check dams was rejected in favor of sowing the burn to mustard seed by airplanes. Mustard seed commonly used in the region for producing a winter cover crop in fields could be had in ton lots and was considered the most suitable for a quick

coverage from the early rains. Foresters will be interested in this recommendation by engineers.

Grazing

Renner, Hormay, and Assistant Forester Kevin of the Plumas Forest, remapped vegetation on the plot inside and outside the fenced areas in Long Canyon. These areas were fenced by administration in 1931, as a start on the proposed study of the effect of grazing on pine reproduction in that locality.

Renner and Hormay, with Assistant Regional Forester Nelson of the Regional Office, and Supervisor Cronemiller, made a preliminary examination of promising experimental areas in the pine zone of the Modoc Forest, including the four fenced areas located respectively at one-quarter, one-half, one, and two miles from water on a sheep range near Badger Springs. Later, eight quadrats were established and mapped, one inside and one outside of each of these fenced enclosures. Also, an extensive reconnaissance was made of an adjoining cattle range regarded by administration as a good location for studies on the effect of cattle grazing on pine reproduction.

Transfer of land-office records of locations and amount of public domain in the Sierra foothills in the San Joaquin Valley was completed. This compilation followed by reference to Wieslander's cover type map and by field examinations, revealed several tracts of rather small acreage, areas that appear to warrant further consideration whenever we are ready to select centers of detailed work.

Late in August, Talbot returned to work from sick leave. His chief field trip, one to the pine belts of the Tahoe, Plumas, Lassen, and Modoc Forests, was made with Assistant Regional Forester Woodbury and in part with Renner and with representatives from each forest traversed. The chief objective of the trip was to obtain a general picture of grazing-and-reproduction conditions in the pine types, and specifically to inspect the fenced enclosures on the Plumas and on the Modoc, referred to in the foregoing paragraphs. Whether these fenced areas will remain as administrative-research projects, or whether they will be taken over by the Station as a definite part of the pine project, remains to be determined by more detailed field studies next spring and summer.

Late in September, results of the range work begun last fall, detailed planning for next year's efforts, and plans for handling the new report on public domain were discussed with Marsh and Chapline of the Washington Office, with Director Kotok and with Regional Forester Show and other representatives of the Regional Office. It was decided that the grazing group of the Station and Nelson and Beeson of the Regional Office should bear the brunt of this new pressure job which must be completed by December. It was agreed that the grazing staff should devote the months of October and November to this assignment. During October, Talbot and Nelson completed a two-weeks' field examination of especially critical areas, Renner and Hormay made more intensive size-ups of selected sample areas, and the group with Beeson began the assembling of available data.

Detection Training School.

During the period of June 13 - July 1, two fire detection meetings were held on the Shasta Experimental Forest. Each meeting consisted of eight days of intensive training in the principles of visibility mapping and detection planning developed on the experimental forest. The meetings were attended by ten forest officers, representing eight northern California National Forests.

The main points covered were, the construction of visibility maps by the use of profiles, the field sketching of visibility, and the use of the completed maps in planning and evaluating the detection system. In addition, the men were given an opportunity to review the projects carried on in the Experimental Forest.

At the completion of the meetings, approximately one-half of the forest officers of the Region responsible for detection planning had received training in the subject. A second meeting for the instruction of southern California forest officers is planned for the spring of 1933.

Landscape Visibility. What is the dependable radius of vision for a fire lookout and how is it affected by direction, time of day and the various obscuring influences? The answer to this question of prime importance is not yet. But the following tentative results of one approach to the problem are abstracted from a recent analysis, for whatever interest they may have to others concerned with this problem.

The lookout observation charts installed on nine Shasta lookouts in 1931 resulted in some 110,000 individual natural target ratings. These represent sixty days of the latter half of the fire season. The targets used had been selected to represent to the eye the probable visibility of a small smoke in the same locality and were rated throughout the day as "plain", "dim" or "not seen" by the observer. Since the direction and distance from the observer of each natural target was known, several variables could be taken account of. This was attempted by a punch card analysis.

Direction - Time of Day Relationships. By summarizing the per cent of plain observations for each hour of the day by eight direction sectors, a series of graphs on polar coordinates were obtained. If it is assumed that the 328 natural targets used represent a fair composite of the landscape, curves connecting these per cent values plotted radially give the shape of the clearly seen area for each hour of the day observed, i.e., 8 a.m. to 6 p.m. The effect of the position of the sun shows up strongly as a controlling factor. This is equally evident by plotting each direction curve against the per cent of plain observations and the time of day.

Numerous tests with artificial smokes have been conducted this summer to correlate these relationships with the visibility of actual smokes. Complete records for the season of 1932 will be available and will be used to verify the above preliminary data.

Study of Going Fires. A start was made with special reference to efficiency of man-power, organization and expenditures. An accurate picture of what takes place, the action of the fire and the action of the suppression forces is recorded by periods on diagrammatic maps. In order to have a record of the factors influencing control, data on weather, cover type and topography are gathered at the same time. For each fire a report is to be prepared giving information which explains or supplements the fire history maps.

It is contemplated that this project will be continued until a fairly large number of case histories are available. Current analyses, however, will be made and inserted in the report mentioned, so that any information which will aid in improved suppression practise may become available as soon as possible.

Forest Products

Logging and Milling Studies

A manuscript report of the Stanislaus study has been revised for publication as a University of California bulletin. This publication will be confined chiefly to a showing of cumulative total costs, values, and margins for each species by log diameter, log grade, and tree diameter. Variations in average costs, values and margins for the stand as a whole when cut to different minimum diameter limits will also be included. Variations in each subdivision of operating activities by species, log grade, log diameter and tree diameter, the showing of which, in terms of minutes per log, per tree, and per M.B.M., as well as in terms of comparative costs in dollars and cents, will make up a very bulky compendium of tables, are to be published separately. Combined with these details of current operating economics there will be an account of selective cutting systems and silvicultural considerations which involve factors far more complex than cutting merely for present profit.

Further studies of lumber depreciation, needed in connection with the Station's general program of logging and milling investigations have been completed or partially completed. Results of the study at the Fruit Growers' Supply Company have already been given. Another study, begun since the last issue of the monthly report, was undertaken at the mill of the Clover Valley Lumber Company. Inspections before and after surfacing white fir showed a heavier degrade than that found in either the Stanislaus or the Fruit Growers' Supply Company studies. It becomes more and more apparent with each new batch of information on seasoning and surfacing degrade that lumber depreciation, by grade and thickness, is a more important factor in determining final relative values of different logs and trees than some of the other variable items which usually receive a great deal more attention in most woods and mill studies.

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CENTRAL STATES FOREST EXPERIMENT STATION

Woodland Grazing Study

Day, with Den Uyl of the Purdue Agricultural Experiment Station, visited the Pinney-Purdue grazing plots at Wanatah, Indiana on October 20-21, and made a complete check of the fenced and unfenced quadrats on all three grazed tracts.

The most interesting observation on this year's grazing was the opening up of the dense patches of blackberry briars, hazel and black cherry reproduction. From all indications the black berries and black cherry either will be dead or so weakened that few leaves can be produced next spring. On many of the unfenced quadrats practically all tree reproduction under 0.6 inch D.B.H. has been trampled down or broken off and completely defoliated. Hazelnut appears to be the least palatable of the woody plants; blackberry was much more severely grazed this year than was the case in 1931. Hickory, which last year was able to put out as many as three distinct crops of leaves following successive defoliations, was unable to produce more than one crop this season, and many of the trees have already succumbed.

DenUyl is now preparing a progress report on the results of the second season's grazing on these tracts, which will include an estimate of the forage value as shown by the gain or loss of weight by the livestock.

Locust Borer Investigation

The month of October has been spent by Dr. Hall partly in field work and partly in office computation. The field work has been devoted to rechecking certain selected permanent sample plots which were established last season, to determine the number of adult locust borers which had emerged during the past fall. A count of young larvae which were active was made on all these plots early in the spring so that it will be possible to determine the mortality per cent in the locust borer larvae under different conditions of tree vigor. While these data have not yet been analyzed, it appears that a very definite relationship exists between mortality of locust borer larvae and vigor of the trees which are attacked: the more vigorous the tree, the higher is the mortality. In some very vigorous trees the mortality may be as high as 100 per cent.

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NORTHEASTERN FOREST EXPERIMENT STATION

Analysis of the data on fire weather for the station in the spruce type at Smyrna Mills, Maine, shows that it will be possible to use the same factors as the basis for estimating moisture content of the duff as in the pine type at Petersham, Mass. Evaporation proved to be the most important single element influencing duff moisture and it is probable that the most reliable estimates can be made from a combination of factors, including evaporation. The combination used at Petersham, namely, relative humidity, air temperature, and hours since rain, however, gives so nearly the same

accuracy as combinations involving evaporation, and has the advantage of being so much simpler for field men to apply, that it will be used in the final report.

On the Gale River Experimental Forest a series of four thinning plots has been installed in a dense growth of even aged spruce and fir about sixty years of age. In laying out these plots the basal area of the residual stands is adjusted to give a series of 100, 120, and 140 square feet per acre, with the check plot having about 164 square feet. The original stand contained an irregular scattering of white pine, paper birch, and poplar, all of which have developed more rapidly than the spruce and fir. These species were removed from all the plots, including the check, in order to eliminate unnecessary variables. In the marking, an effort was made to have the basal area and distribution of diameter classes of the unmerchantable sizes in the residual stand practically uniform on all the plots.

On the Bartlett Experimental Forest a pair of plots were established, in one of which the thinning or improvement cutting was made with the primary objective of studying the reaction of yellow birch on opening up of the stand. Meteorological records have been obtained from these plots for the past year. On about 55 acres of this Forest in which fuelwood cuttings had been made in recent years, selective girdling operations to remove scattered wolf trees were carried out. Two men were able to cover this area in half a day.

On another area of about 25 acres an experiment in selective weeding to favor ash, yellow birch, and sugar maple has been carried out. This area has been cut heavily for fuelwood from 8 to 10 years ago, and the valuable species are threatened with severe competition from less valuable growth over most of the area. Detailed results of the operation will be studied on an intensive plot and a check area.

Scouting for the European pine shoot moth in Massachusetts by representatives of the Massachusetts Conservation Department and the Bureau of Entomology substantiated the preliminary report made at the summer meeting of the Northeastern Forest Research Council, that except for local infestation near Boston, the insect is not yet present north of the Connecticut line.

MacAloney has established a new permanent plot to study additional details on the recovery of severely weevilled pine plantations after treatment. Special attention will be given to the effect of pruning all but one stem in high forks and the time required to heal over pruned limbs of various sizes.

The bearing of cones by trees in young coniferous plantations of New England has been observed several times during the past summer. Of special interest is a white spruce plantation at Waterville, Maine, in which 7 year old transplant stock was set out during the spring of 1932. One tree, 1.5 foot high, bore two mature cones in the fall of 1932. The seeds will be tested for germinative capacity.

Other young plantations in which trees were observed bearing cones included 10 year-old white pine, 11 year-old Norway pine, and 13 year-old Scotch pine. Incidentally, an abundance of cones was observed this fall on red spruce, white pine, red pine, and pitch pine in portions of Maine, New Hampshire, and Vermont.

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NORTHERN ROCKY MOUNTAIN FOREST & RANGE EXPERIMENT STATION

Fire

Analysis of the Fire Records

On October 15 first draft copies of the report covering the analysis of the fire records for 1921 to 1930 were sent to Hornby and Jefferson for review and comments. Revision in accordance with their suggestions should be completed by November 15. Submission to the Washington office and a board of review is planned for mid-December, with revision and publication in either mimeographed form or as a cooperative bulletin with the University of Montana sometime in February or March.

Measuring Fire Danger

Comments concerning the Fire Danger Meter have been received from eight Forests. Indicative excerpts follow:

Bitterroot: "We have found its most important use lay in the fact that almost every major factor involving fire control had to be considered at one time before reaching a definite decision as to just what fire class existed. As a guide in deciding the degree of danger the device certainly furnished us with one additional useful tool. Possibly our danger chart shows a conservative estimate of actual fire conditions."

Blackfeet: "I believe the danger meter is very helpful in determining the degree of danger, eliminating to a large degree the element of personal estimation and reducing the many factors of fire danger to a single comparative number." And by one ranger: "These measurements (of fuel moisture) used in connection with the fire meter gave a very accurate picture of fire danger on the district."

Cabinet: "The feeling is that these meters will be of greater value next year when the men are more familiar with them. --- We feel that the meter was of great help in showing lack of necessity in placing emergency men and retarding placement of the regular force."

Coeur d'Alene: "There is unanimous agreement that the use of the meter was found helpful in judging conditions. --- The set of wood cylinders is so foolproof, so easy to understand, and so substantially sensitive to moisture or drying conditions that it establishes confidence in its value. The duff hygrometer is more flighty."

Flathead: "I am not prepared at this time to give any detailed remarks concerning the new Danger Meter, but must admit that I was agreeably surprised by the accurate results obtained with it this year."

Pend Oreille: "It was found that the chart (showing class of danger, determined by the meter) indicated very closely the daily changes in danger conditions, but on the whole registered somewhat above the actual danger conditions as they existed on the Forest."

Selway: "The Danger Meter is a valuable tool for determining fire conditions but it would appear that more than one set of instruments (wood cylinders and duff hygrometers) should be installed on this Forest to more nearly determine the conditions which appear to be extremely localized."

St. Joe: "We find that the Fire Danger Meter has a use in the determination of fire dangers from day to day and considers all the factors which effect burning conditions. In a normal year there may be a tendency for the meter to rate conditions slightly higher than they really exist on the ground, but when considering an abnormal year we believe that the meter is about right."

Several of the Forests indicated the need of more fuel moisture measuring stations if that factor on the meter is to be most reliable. Others pointed out desired changes in the weight given to the higher wind veolocities, to moderately low humidity, to the range of conditions included in one class of fire danger, etc. All of these suggestions are helpful and will be used in revising the meter this winter.

Products

Logging and Milling Studies

It was expected that the final field work for the Anaconda Copper Mining Company selective logging study would be well under way or completed at this date. However, the company is still undecided as to the exact date the camps will resume logging.

A marking board composed of Bradner, Neff, Anderson, Clark of the University of Montana, and Mason of the Polleys Lumber Company marked the economic selection plot for cutting during the month. A flexible minimum profitable tree size limit of 21 inches d.b.h. was used. Out of a total estimated volume of 95,000 feet of ponderosa pine contained in trees 12 inches d.b.h. and over, an estimated volume of 45,000 feet was designated for cutting, a little less than half of the total volume that would be cut under a clean cutting system. While this volume is small, it does not necessarily indicate that logging costs will be materially increased because of the scattered nature of the timber. All of the plots are rectangular in shape and extend from the bottom of a small draw to the top of the ridge. The designated cut on the upper portion of the plot on the ridge and immediately under the ridge was very light.

Anderson, in company with K. D. Swan of the Regional office of Public Relations, made a complete photographic record of the area during the past month. Practically 60% of the trees on all three areas have been photographed in detail, showing position, size, and distribution of knots, and character of bark for the first two and sometimes three logs. Numerous pictures were also taken to show character of crown, using the Dunning tree classification as a guide in selecting the pictures. It is hoped that these picture records will be useful in determining the reasons for the difference in yield of lumber in various trees.

Experimental Fence Posts, Miles City, Montana

This experiment, begun in 1926, includes treated and untreated posts of the following species: ash, cottonwood, western red cedar, lodgepole pine, and ponderosa pine. Part of the posts were treated with sodium fluoride or zinc chloride by the steeping process and part of them with creosote petroleum mixtures by the hot and cold bath process. Some posts of each species were also treated with Anaconda Wood Preservative (cold treater dust) when set.

A comparison of the results from the various preservatives, as shown by a recent examination of all posts after about 6 years of service, is given in the following summary:

Preservative	Number of posts set	CONDITION							
		Good		Partly decayed at butt		Badly decayed at butt		Removed	
		No.	%	No.	%	No.	%	No.	%
Zinc chloride	308	292	94.8	10	3.3	1	0.3	5	1.6
Sodium fluoride	267	207	77.5	44	16.5	11	4.1	5	1.9
Creosote	90	90	100.0	..	..	..	..	..	..
Arsenic*	168	111	66.1	33	19.7	12	7.1	12	7.1
Untreated	134	67	60.0	40	29.9	12	8.9	15	11.2

*Cold treater dust.

The main purpose of this series of experiments was to determine the effectiveness of sodium fluoride and zinc chloride by steeping - a process which has been little used in the United States. The use of zinc chloride by this process at Miles City is proving to be very effective, even with cottonwood, which is especially non-durable and one of the most difficult to treat successfully.

With ponderosa pine and lodgepole pine the sodium fluoride is giving very good results. However, at the end of 6 years over 70% of the cottonwood posts treated with this preservative show considerable decay. Ten per cent of the sodium fluoride treated cottonwood posts have been replaced because of decay.

Range

Weather was one of the chief items of interest at Miles City during October because of a snowfall of at least 7 inches that occurred there at the end of the first week and another of about 13 inches that took place during the third week. This unusual snowfall soon melted but it interrupted Kennedy's field quadrat work as well as improvement developments. Without doubt, gains of the cattle in the various experimental pastures will be reduced over September.

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

General

October was a busy month at Pringle Falls with 17 miles of new roads constructed, a two-room office cabin built, five permanent sample plots established and fenced, and the twelve miles of boundary posted.

With the new roads every portion of the experimental area is within one half mile of an automobile road. These roads were laid out to make the area accessible for fire protection, to facilitate logging and experimental work, and to open up the several forest types, and the top of Pringle Butte.

The 5 one-acre fenced plots were established in cooperation with the regional office of grazing. In addition to studying the effect of grazing on pine reproduction, observations will be made on shrubs and grasses. Three of the areas have been heavily overgrazed, another is located in a 6-year-old burn where forage shrubs and reproduction are struggling to become re-established under the heavy sheep grazing. In the near vicinity of each fenced plot is an unfenced check plot.

Mensuration

Ponderosa Pine Even-aged Yield Study - A 10-day trip through the western part of Region 1 gave Meyer a glimpse of the conditions in which plots would be taken in even-aged stands of ponderosa pine for Montana. Regions 1 and 4, which have been visited so far, will give an abundance of younger age classes, chiefly below 60 years, but in neither will the older age classes be easily found. To round out the study still further, data have been borrowed from the British Columbia Forest Branch with the idea of choosing material which approximates our standards.

Selective Logging

Brandstrom spent two weeks from September 28 to October 10 on detail at the Forest Products Laboratory at Madison, working with Kirkland and Carver on data required for the Copeland Report; also in conferring with Carver on standardization of the technic to be followed in making selective logging studies in the various forest regions.

While at Madison, Kirkland and Brandstrom also looked into the question of reducing existing data on logging costs, secured in time and cost studies in the various regions, to a comparable basis so that it might become possible to make direct comparisons of the efficiency of various methods of logging of timber of different size classes. Present methods of presenting the results of selective logging studies do not allow such interpretation to be made on account of lack of standardization in the technic followed, and on account of failure to specify in detail the basis of cost (machine rates). A memorandum was drawn up on what steps should be taken to get these items reduced to a standardized procedure. Further action was deferred until next spring when a meeting is planned at which these questions can be finally decided.

New Public Domain

New public domain field data were collected in Douglas County showing how much acreage was delinquent, where each delinquent parcel was located, its assessed valuation, years for which it was delinquent and ownership thereof. In addition, data were gathered showing area and location of property owned by county, municipal, state and federal agencies.

To date 11 counties have been covered in this manner, six in Oregon and five in Washington. All field men have been released from duty. During the month progress has been made in computing and arranging these data.

When in Douglas County, Mr. Wilson spoke briefly before Roseburg High School students on Forest Recreational Values. On the morning of October 15, Mr. Wilson reviewed with the commissioners of Douglas County, at their request, delinquency data as gathered and was asked for copies of our findings as soon as releases could be made.

Requests for information gathered in the new public domain study have been received from officials in various counties, from state foresters and tax commissioners, from the Oregon Bankers Associations and other dependable agencies interested in trends of reversion. Releases at this time will be limited.

Awareness of land delinquency and of the consequences thereof has not been general in this district. However, state and county officials, economists at the colleges and universities, and a few Chambers of Commerce in Oregon, have of late become sufficiently cognizant of the situation as to consider calling a state-wide land use conference. Mr. Wilson has cooperated in laying plans for such a conference.

Section of Forest Products

Douglas Fir Mill Scale Studies - Tabulating cards for the two mill scale studies made during the early summer have been punched and verified. It is planned that Lodewick will take these to Berkeley during December for sorting and tabulating.

In determining the average annual log production for Washington as a whole, based on Census Bureau and other records, it was found that during the period 1925 to 1929, it amounted to 6,595,651 board feet, log scale.

Log Scaling and Grading Practice in the Douglas Fir Region - This report of 43 pages was mimeographed, 200 copies being made. Though only 120 copies were sent out, the remaining supply has been almost exhausted because of second requests.

Silviculture

Broadcast seeding with the small seeded species of the fog belt is showing favorable results when done the first and second year following slash burning. A 1928 burn seeded in January 1929 with 1.6 pounds per acre of Sitka spruce, western hemlock and red cedar now has 2800 seedlings per acre; part of the same area seeded in January 1930 at the rate of 2.24 pounds of seed now has 1900 per acre. The 1931 and 1932 seeding on the same area was a failure; however, both the 1931 and 1932 seeding on fresh burns showed good results. A freshly burned area on low moist ground was seeded with red alder at the rate of 1 pound per acre in January 1932, and now has over 13,000 seedlings per acre.

These results indicate decided possibilities for broadcast seeding where small seeded species can be used.

Forest Survey

The base maps for western Oregon and Washington have been corrected, revised, and the tracings sent to Washington. A number of agencies have made use of the type maps, including forest schools, state foresters, forest engineers, cruising firms, investment bankers, timber operators, agricultural economists, and county officials. At present three different agencies are paying men to copy type maps in the survey office.

Forest Insurance

The first half of October was spent in the field introducing Frost to the work and getting him sufficiently familiar with the requirements so that he was able to carry it on by himself. This work was done in Deschutes and Klamath Counties and when Frost was left by himself at Klamath Falls, there still remained for completion the areas selected for study in Klamath and Lake Counties.

After leaving Frost, Shepard went into eastern Washington and spent the remainder of the month and the first week in November studying fire loss conditions in the field in the ponderosa pine region of that state. This work involved extensive observations of the country from the hazard point of view, the interviewing of wardens and rangers, and the detailed analysis of seven burned areas aggregating approximately 3000 acres.

During October detailed analyses were completed on eleven burns covering approximately 11,000 acres, bringing the total to 27 burned areas and approximately 23,000 acres.

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Red Gum Growth and Yield

The field crew of the red gum growth and yield study moved from Arkansas into Mississippi. Owing to the well-developed agricultural practice of the bottomland region of this State, few sample plot locations were anticipated. However, a number of stands suitable for plot establishment were found on abandoned land lying between the levee and the Mississippi River, the so-called "batture" land. It is believed that continuous timber production on these areas is more nearly practicable from an economic standpoint than on other Delta lands. Relief from excessive taxation is the principal favoring factor, since lands unprotected by the levees are not subject to drainage taxes, which commonly are as high as $.50 to $1.00 per acre per year, nor are they subject to levee or road taxes. As a result, several far-sighted lumber companies are purchasing areas of batture timberland with a view to continuous production. Two have of their own initiative established a rough diameter limit method of selection cutting.

Erosion

Meginnis spent a considerable amount of time in regulating and starting equipment installed at the mouth of two gullies. This equipment consists of a settling tank for de-silting the run-off water and a wier box provided with a 90° triangular notch and a Stevens water level recorder for measuring the discharge. After preliminary trials which indicated that the equipment would function properly and measure the discharges satisfactorily, final methods for securing, tabulating and computing the data were worked out and new forms prepared for these purposes.

Three light rains occurred during the month, bringing the total number of rains up to 70 for which data has been obtained from the run-off plots.

Another small litter experiment was started in connection with the barren run-off plots. Forest litter was removed from the same size plot under a virgin forest cover and applied to the surface of one of the severely eroded, barren run-off plots in order to study its effects on surface run-off. The data obtained can be very accurately checked against that obtained prior to application and also against that secured from a duplicate plot, during any one rain. Waterholding capacity tests indicate that the litter used is capable of absorbing only .32 inches of rainfall.

The 1932 plantings are very promising although insect damage was heavy during the latter part of this current season. Black locust was almost defoliated by the leaf miner and borer damage on the larger trees was also pronounced.

Naval Stores

All trees at Kingsley were scraped and the last streak cut. At Sampson scraping was started but one more streak will be cut before the last dip is made.

Olustee Experimental Forest

The offices in the new Post Office building were occupied October 1st by the Lake City Branch Station. The suite of rooms consisting of several offices, a laboratory and a dark room, furnished mostly in new dark oak furniture makes ideal office quarters.

Forest Survey

Winters spent considerable time in computing the upland hardwood growth and the areas of the various forest conditions. Stand tables by condition and type were prepared and the hardwood taper ratio volume tables were recomputed for Doyle scale values. During the last week of the month, work was resumed in the shortleaf pine uplands of Mississippi.

Forest Pathology

During the summer of 1932 Hepting dissected and examined for decay and insect activity 602 fire-scarred trees of 9 species of delta hardwoods between 3 and 11 inches D.B.H. This work was carried on in both the southern and northern portions of the Mississippi Delta in Louisiana. The purposes of this study are to secure information on (1) the importance of fire in the breaking of young trees from basal decay; (2) the importance of fire in causing future cull in the surviving trees; (3) the relative susceptibility of the various species to decay; (4) the organisms responsible; (5) the rate of healing of fire scars; and (6) insect activity behind fire scars. This work follows a brief study on fire and decay relationships made in the same region in 1931 by Kaufert.

Siggers spent a week with Hepting in the vicinity of Lake Providence, Louisiana, studying roots of fire-scarred ash to determine how far rot following fire injury extends downward into the roots. Based on a study of the roots of a few trees, the indication is that there is no general downward progression of the decay in the trunk below ground level.

An excellent lot of blight-resistent Asiatic chestnut seedlings is being raised this season in the Louisiana State Nursery. An estimate made on October 15th showed that 10 to 11 thousand seedlings were growing in the nursery.

Forest Products Pathology

A preliminary examination of dipped poles, after 30 days of seasoning, at the T. R. Miller Mill Company's plant, Brewton, Alabama, by Dale Chapman was very encouraging. All of the stock given one of the three dipping treatments was bright, with practically no evidence of stain or mold. Seventy untreated control poles piled under identical conditions adjacent to the treated stock were heavily stained and molded. Part of each group of poles given a particular treatment was sprayed after 30 days of seasoning with a solution of the same chemical, in order to protect the freshly exposed surfaces of the seasoning checks. This will be followed by a similar spraying at the end of 60 days seasoning.

Several of the lumber dipping treatments established during the summer have just been completed. So far the results obtained with sodium tetrachlorophenolate and the ethyl mercury chloride compounds largely confirm those of last year. Sodium 2-chloroorthophenylphenolate, used in commercial tests for the first time this year, appears very promising on pine, but somewhat inferior on hardwood species. The ethyl mercury oleate emulsion is continuing to show up very well on both pine and hardwood. Practically all these tests will be completed in about 3 weeks, and a good basis will be established for determining the relative effectiveness of the several treatments used under a wide range of conditions.

Other Activities

Demmon spent practically the entire month on the fire bulletin manuscript, which will represent the Station's first major contribution on the fire problem in the South. Miss Kerr assisted various members of the Station staff with their writing and issued a helpful manual of suggestions for experiment station writers. Wakeley observed that 100 average longleaf pine cones have about the same volume as that of the annual ring of a 12-inch tree. Pessin made additional microtome studies of the stem and roots of longleaf pine seedlings, again finding that they do not show any annual rings, regardless of age, until terminal buds are produced.

The Financial Aspects staff made rapid progress on two case studies of operations practising forestry in the shortleaf-loblolly-hardwoods type, one virgin and the other second-growth.

Bickford spent the first half of October obtaining information by means of a crop meter on the drainages of the Sabine, Neches, Trinity and a part of the Colorado Rivers in Texas, and the balance of the month in assembling the information for the Copeland report. Craig is examining the land tax delinquent situation in Washington County, Arkansas. The tax records of the county indicated that 103,326 acres were delinquent exclusive of 1931 delinquency, but checking sample descriptions in the field revealed that many owners held tax receipts for land listed as delinquent on the county tax books. Craig estimates that about 34,000 of the 103,326 listed as delinquent by the county are not actually delinquent and states that a confusion of the records is responsible for a considerable amount of the apparent delinquency.

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RESEARCH ACTIVITY DURING OCTOBER, 1932

During the first three weeks of the month, Roeser confined his activities strictly to the Fremont Station because of Williamson's incapacitation due to injuries received in line of service. The principal task accomplished during this period, in addition to the routine type study observations, was the annual or periodic examination of 79 plantation plots in the following projects:

Fs 101(d) - Geographical strains in ponderosa pine; planted in 1920.
Fs 101(d) - Development of improved and mistletoe resistant strain of ponderosa pine by natural selection, and by artificial crossing; planted in 1932.
Fs 101(d) - Comparative vigor in relation to the elevation of seed source in ponderosa pine; also planted in 1932.
Fs 101(d) - Individual variation in ponderosa pine; planted in 1930.
Fs 103(d) - Geographical strains in lodgepole pine; 1915 and 1919 plantations.
Fs 103(d) - Vigor class strains in lodgepole pine; planted in 1924.
Fs 161(d) - Hereditary character of individual variation in Douglas fir; planted in 1930.

No time has been found to compile the data obtained for most of these experiments. Because of the severe drouth conditions which prevailed all summer, much interest was centered in the survival data for the ponderosa pine plantation planted in April to develop, by natural selection, an improved strain of this species. Artificial watering was employed to keep the trees alive during the season. Largely because of this, the mortality for the first year was held at 15.9%. The loss due to rodents (gophers) was negligible, amounting to only .4%.

The results of the 1920 planting to study the relative development of geographical strains in ponderosa pine are shown in the following tabulation, which is based on the measurements made in 1932. The seven geographical lots which are involved are listed in the order of their remoteness from the Fremont planting site:

Source of Seed	Trees Planted	Survival Percentage	Average Height (inches)	Average Increase in Height (inches)
Bitterroot	129	9.3	6.06	1.47
Tusayan	170	14.1	8.99	3.64
Harney	142	51.4	23.10	17.15
Uncompahgre	125	67.2	16.34	11.29
Roosevelt	141	53.9	18.98	14.05
Cochetopa	140	56.4	17.17	12.92
San Isabel	128	64.1	18.24	13.59

The differences between lots originating within the Region are not pronounced, even though South Dakota and Western Colorado sources are involved. In the matter of growth and form development, the Black Hills stock ranks above the more local Colorado stock. However, the poor success which may be expected from Northern and Southwestern Rocky Mountain sources is all too apparent.

During the reconstruction of the fence enclosing the Fremont Experimental Forest this fall, the opportunity was presented to make the first definite observations upon the condition of variously treated Douglas fir and ponderosa pine posts which were used in the building of the fence in 1910. Before setting the posts, 21 were boiled in creosote, 22 were charred,

and 23 were given no treatment whatsoever. Only dry posts were used. They were about equally distributed between a gentle and heavily timbered north slope and a moderate and open south slope. After 22 years, the condition of the posts was found to be as follows:

Character of Treatment	No. of Posts	Completely rotted (100%)	Badly rotted	Slightly rotted	Sound
Boiled in creosote	21	7	0	0	14
Charred	22	12	2	0	8
No treatment	23	12	7	2	2

The percentage of sound posts was 67% for those boiled in creosote, 36% for those which were charred, and only 9% for the untreated posts, approximately 22 years after setting.

On October 24, Roeser left Colorado Springs and spent the rest of the month within the territory of the Southwestern Station obtaining first hand information on the erosion problems in the Southwest, particularly those of the Tonto Basin, and the methods in use, and also in process of development, for studying erosion at the newly established Parker Creek Station. The trip was extremely instructional in many ways. The impression was obtained that erosion in the Tonto Basin country is much more insidious and less apparent than it is in the valuable watershed region within the Front Range of the Rockies, principally because of different soil conditions and geologic structure. However, conditions on the Summit plots, where the soil is of granite origin, are, in many respects, quite similar to those prevailing on areas where erosion is being studied on the Pike Forest. Cooperrider's erosion profile method of study is similar in technique, although on a much more comprehensive basis, to that initiated locally in 1931 on the South Platte area, and the two experiments should provide some interesting and significant comparisons. After studying the field installations, Roeser visited with Cooperrider at Tucson and became familiar with the latter's technique of interpreting the results in terms of run-off and erosion, and the relation between these factors and the ground cover.

While in Arizona, the opportunity was had to visit the Fort Valley Station in the company of Director Pearson. Having become only casually acquainted with the southwestern ponderosa pine type in its northern extension in Colorado, it came as a surprise to note the comparative ease with which it succeeds in reproducing itself where conditions are at all favorable. Although there is considerable difference between the character of the pine stands in the Black Hills and those in the Southwest, in many respects the situation relating to the natural regeneration and to the perpetuation of the two types of stands under management appears to be essentially similar.

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